

Remarks

Claims 1 and 3-43 are pending in the application. Claim 2 has been canceled without prejudice, and claims 4-20 and 22-34 have been withdrawn from consideration pursuant to a restriction requirement by the Examiner. Claims 1, 3, 21 and 35-43 stand rejected. Favorable reconsideration is respectfully requested in view of the following remarks.

Claims 1, 3, 21, 35-37, 39 and 41-43 were rejected as being anticipated by Willmann (US 5,044,700). To anticipate a claim under § 102, a single prior art reference must identically disclose each and every claim element. See Lindeman Maschinenfabrik v. American Hoist and Derrick, 730 F.2d 1452, 1458 (Fed. Cir. 1984). If any claimed element is absent from a prior art reference, it cannot anticipate the claim. See Rowe v. Dror, 112 F.3d 473, 478 (Fed. Cir. 1997). In view of the foregoing authority, the Applicant respectfully submits that the cited reference does not support the asserted rejection, for at least the reason the reason that Willman does not disclose changing means as required by each of independent claims 1, 42 and 43, nor a master cylinder characteristic control device as required by independent claim 35.

Independent claims 1, 42 and 43 each recites an assisting device for applying an assisting drive force to the pressurizing piston of the master cylinder. The assisting drive force is different than a primary drive force to be applied to the pressurizing piston on the basis of a brake operating force acting on the brake operating member. Claims 1, 42 and 43 each further recites an assisting drive force control device, and each includes the limitation that the assisting drive force control device includes changing means for changing the relationship between the assisting drive force and the operating force and/or stroke of the brake operating member in a normal operation of the braking system. This teaching is absent from Willman.

Willmann relates to a hydraulically operated braking system wherein pressure chamber 13, which is formed between first master brake cylinder piston 12 and brake pedal rod 2 (piston 8), is supplied with pressurized fluid delivered from servo pressure source including pump 46 and accumulator (reservoir) 51 through booster valve assembly (49, 54). Please refer to col. 3, lines 20-35 and col. 5, lines 26-30 (claim 1, lines 11-15). Claim 1 of Willmann states that the pressure chamber 13 constitutes a part

of a hydraulic brake booster. Concerning the brake booster, please also refer to col. 1, lines 13-15, 19-21 and 48-50.

At col. 3, lines 36-45, Willman states that "[u]pon actuation of the brake pedal 1, pressure fluid is fed into the pressure chamber 13 via the supply line 45 by the opening of the magnetic valve 49 and the closure of the magnetic valve 54", and further states that "as a result, a motion of the first master brake cylinder piston 12 takes place separately from an imposition of pressure by the piston rod 10, until such time as the set-point travel desired by the control unit 36 is attained." The motion is controlled "by comparison of the values that are obtained from the travel sensors 39, 40". Please also refer to col. 1, lines 42-46, and col. 4, lines 26-39.

It is assumed solely for purposes of discussion that elements of the above-described structures of Willmann, according to one possible point of view, are analogous to elements of the assisting device of recited in each of claims 1, 42 and 43. Given this interpretation (others are possible), Willmann clearly fails to teach that the structures described above include **changing means as recited in claims 1, 42 and 43**. That is, claims 1, 42 and 43 recite that the changing means changes a relationship between said assisting drive force and "at least one of an operating force and an operating stroke of said brake operating member ... said relationship being in a normal operation of the braking system with an operation of said brake operating member."

There is nothing in Willman corresponding to the claimed structures noted in the foregoing. This may be understood by observing that in Willmann, the relationship between the travel distances of the piston 12 and rod 2 is fixed, and not changeable by control unit 36 (where piston 12, rod 2 and control unit 36 are assumed for purposes of discussion, as noted earlier, to be analogous to claimed structures). The following explanation shows why this is the case, and why, in view of this fact, changing means as claimed is not disclosed in Willman.

Willman states that the "set-point travel of the first master brake cylinder piston 12 is greater than the travel of the pedal rod 2" (col. 3, lines 46-47), and that the "displacement travel of the master brake cylinder piston (12) is intentionally longer than an associated displacement travel of the pedal rod (2)" (col. 5, lines 56-58). In the braking system as disclosed in Willmann, fluid pressure generated by the servo

pressure source 46, 51 is applied to the pressure chamber 13 of the brake booster through the booster valve assembly 49, 54 under the control of the control unit 36, so that the travel of the master brake cylinder piston 12 detected by the second travel sensor 40 is longer than the travel of the pedal rod 2 detected by the first travel sensor 39. The booster valve assembly 49, 54 is controlled by the control unit 36 "by comparison of the values that are obtained from the travel sensors 39, 40" (col. 3, lines 43-45), or by comparing the detected travel distances with set-point values (col. 1, lines 59-65), or as a function of the pedal travel (Abstract), or "as a function of a comparison of the first and second values in such a manner that a value from the first travel sensor that varies upon displacement of the pedal rod (2) leads to an approximation of the part of the value from the second travel sensor (40), to the first value from the first travel sensor (39), via displacement of the master brake cylinder piston (12) by imposition of pressure from the servo pressure source (46, 51) via said booster valve assembly (49, 54)" (claim 1, col, 5, lines 59-68).

Willmann does not provide a detailed description on how the set-point of the first master brake cylinder piston 12 (col. 3, lines 45-47) or the set-point values (col. 1, lines 62-63) is/are determined or set by the control unit 36. Judging from the disclosure in Willmann as a whole, the distance of travel (e.g., 30mm) of the master brake cylinder piston 12 to be obtained by the pressure application to the pressure chamber 13 is determined by the distance of travel (e.g., 10mm) of the pedal rod 2 detected by the first travel sensor 39. This relationship between the travel distances of the **piston 12 and rod 2 is fixed**. Nowhere in Willmann is there a teaching that the control unit 36 changes this relationship, that is, a relationship between the assisting drive force generated by pressure application to the pressure chamber 13 and the operating stroke of the brake pedal 1 or pedal rod 2 detected by the travel sensor 39.

By contrast, as noted above, claims 1, 42 and 43 include the limitation that the assisting drive force control device includes changing means for changing the relationship between the assisting drive force and the operating force and/or stroke of the brake operating member in a normal operation of the braking system. This teaching is absent from Willman.

It is observed more generally that Willman does not even recognize or suggest the concept of changing the relationship between the assisting drive force and the travel distance of the pedal rod 2. In other words, the travel distance of the master brake cylinder piston 12 (assumed for purposes of this discussion to be analogous to the claimed the assisting drive force) for a given distance of travel of the pedal rod 2 is fixed.

By contrast, in the braking system defined by claims 1, 42 and 43, the assisting drive force corresponding to a given operating stroke of the brake operating member, for example, may be controlled to be larger when the vehicle running speed is comparatively high, than when the vehicle running speed is comparatively low, as described on page 6, lines 7-11 and on page 92, lines 19-25 and as shown in Fig. 9. Alternatively, the relationship between the assisting drive force and the brake operating stroke for may be changed depending upon the friction coefficient of the road surface or the ambient temperature of the vehicle, as described in the paragraph bridging pages 6 and 7. Further alternatively, the relationship may be changed depending upon the rate of change of the operating force or stroke of the brake operating member, as described on page 93, lines 1-15 and as shown in Fig. 10. Willmann, on the other hand, never suggests the concept of changing the relationship between the assisting drive force and the travel distance of the pedal rod 2.

It is noted that claims 1 and 42 further recite that the changing means includes "pressure-reducing means for reducing a pressure of the fluid in said brake cylinder for a given value of said brake operating force, by reducing said assisting drive force [claim 42: a force of operation] ... without reducing said primary drive force applied to said pressuring piston on the basis of said brake operating member". This feature is also absent from Willmann. The assisting device disclosed in Willmann does not permit reduction of the assisting drive force without releasing the brake pedal 1 or without reducing the operating stroke of the brake pedal 1 or pedal rod 2, namely, without reducing the primary drive force applied to the pressurizing piston (assumed in this discussion to be analogous to piston 12) on the basis of the brake operating force, as recited in claims 1 and 42 in connection with the pressure-reducing means. In the braking system of Willmann, the reduction of the fluid pressure in the pressure chamber

13 (assumed in this discussion to be analogous to the claimed assisting drive force) necessarily requires reduction of the operating stroke of the brake pedal 1. Thus, Willmann further fails to teach the pressure-reducing means recited in each of claims 1 and 42.

It is further noted that while the Examiner alleges that cylinder 4 and piston 8 correspond to the recited assisting device, claims 1-18 of Willmann clarify that the pressure chamber 13 supplied with the pressurized fluid from the servo pressure source 46, 51 through the servo valve assembly 49, 54 constitutes a part of the hydraulic brake booster. The chamber 4 and piston 8 and the corresponding valve assembly 57, 60 are provided for anti-skid control and traction control of the pressures of the wheel brake cylinders 24, 26, 29, 30, as described in the paragraph bridging columns 3 and 4, and the following paragraph of Willmann.

The discussion now turns to independent claim 35. Independent claim 35 recites a master cylinder characteristic control device for controlling an amount of fluid in a pressurizing chamber of a master cylinder, on the basis of a brake operating condition quantity, to thereby change a relationship between a position of the pressurizing piston of the master cylinder relative to the cylinder housing and a fluid pressure in the pressurizing chamber. Willmann is silent as to the claimed features, and therefore the asserted rejection for anticipation cannot stand.

The statement of rejection of claim 35 by the Examiner does not indicate which element of Willmann is alleged to correspond to the recited master cylinder characteristic control device. As described above, Willmann fails to teach changing the position of the piston 12 for a given travel distance of the pedal rod 2; Willman also fails to teach changing the amount of fluid in pressurizing chamber 15 of master cylinder 7, on the basis of the travel distance of the pedal rod 2, to thereby control the relationship between the position of the piston 12 relative to the housing 6 and the fluid pressure in the pressurizing chamber 15.

Willmann never shows any means for introducing and discharging the fluid into or out of the pressurizing chamber 15, to reduce or increase the operating stroke of the pressurizing piston for a given value of the fluid pressure in the pressurizing chamber

15. In this respect, please refer to the paragraph bridging pages 50 and 51 of the present application.

In consideration of the above, Willmann does not disclose each and every claimed element of independent claims 1, 35, 42 and 43 as required to sustain a rejection for anticipation. Thus, claims 1, 35, 42 and 43 are allowable over Willman. Accordingly, the claims dependent on claims 1, 35, 42 and 43 are likewise allowable for at least the reasons discussed in connection with claims 1, 35, 42 and 43. Withdrawal of the rejection of claims 1, 3, 21, 35-37, 39 and 41-43 as being anticipated by Willmann is therefore respectfully requested.

Claims 38 and 40 were rejected under 35 USC 103(a) as being unpatentable over Willmann in view of Schramm et al. (US 5,954,407). Claim 38 depends on claim 1 and therefore includes the limitations of claim 1. Claim 40 depends on claim 35 and therefore includes the limitations of claim 35. Deficiencies in Willmann with respect to claims 1 and 35 have been outlined above; Schramm et al. does not cure these deficiencies. Therefore, claims 38 and 40 are allowable over Willmann and Schramm et al. for at least the reasons discussed in connection with claims 1 and 35. Withdrawal of the rejection of claims 38 and 40 as unpatentable over Willmann and Schramm et al. is therefore respectfully requested.

In light of the above discussion, Applicant respectfully submits that the present application is in all aspects in allowable condition, and earnestly solicits favorable reconsideration and early issuance of a Notice of Allowance.

The Examiner is invited to contact the undersigned at (202) 220-4323 to discuss any matter concerning this application. The Office is authorized to charge any fees related to this communication to Deposit Account No. 11-0600.

Respectfully submitted,

Dated:

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